A NEW SPECIES OF *HETERANTHIDIUM* FROM CALIFORNIA (HYMENOPTERA: MEGACHILIDAE)

By Roy R. Snelling[1]

Abstract: *Heteranthidium autumnale,* a member of the *zebratum* complex, is described from a single pair collected near Desert Hot Springs, California. The complex is reviewed; H. *timberlakei* is elevated to species level and *H. subtimberlakei* is synonymized with it. Under *H. zebratum* are the synonyms *H. z. chippewaense, H. z. mississippi* and *H. cockerelli.* A key to United States species of *Heteranthidium* is given.

The following species is described at this time in order that the name may be available for inclusion in a taxonomic study of the California Anthidiinae by A. A. Grigarick and L. A. Stange, as a part of the California Insect Survey series.

Heteranthidium autumnale, NEW SPECIES

Figure 1

This species may be separated from its congeners in both sexes by the following combination of characters: anterior coxae with distinct, sharp spines; pronotal lobes with strong, high, sharp carina; mesopleurae immaculate. The female is further characterized by the evenly convex, non-denticulate, anterior clypeal margin.

Male: Length, 14 mm.; of forewing, 10 mm. Black, with yellowish white maculae as follows: mandibles, except apical margin and teeth; labrum; clypeus, except reddish, translucent apical margin; roughly stirrup-shaped supraclypeal mark; lateral face marks, ending narrowly at level of lower margin of anterior ocellus; underside of scape; stripe along lower, outer margin of eye for about one-fourth eye length; irregular stripe behind upper one-fourth of eye; narrow, irregular, medially interrupted stripe across top of vertex; minute spot on anterior margin of pronotal lobe; short, broad stripe on mesoscutum adjacent to tegulae; comma-shaped mark on tegulae; minute spot on axillae; pair of submedian spots on mesoscutellum; underside of anterior and middle femora, two spots at apex of hind femora; basally and apically broadened stripes on all tibiae; all basitarsi; spot on second segment of hind tarsi; medially attenuated subapical bands on tergites I-V, those of I and II anteriorly emarginate, those of III-V with free, or nearly free, lateral black marks; tergite VI largely yellow, except extreme base, apical rim and pair of small, lateral, brownish spots; tergite VII with a pair of preapical spots; sternites II and III with small lateral spots. The following are ferruginous: legs, except for maculae noted above, the ferruginous becoming very dark on the femora posteriorly; tarsal claws, tips darker; all sternites entirely, except as noted above; extreme lateral margins of tergites. Wings brownish-hyaline, veins and stigma dark brown.

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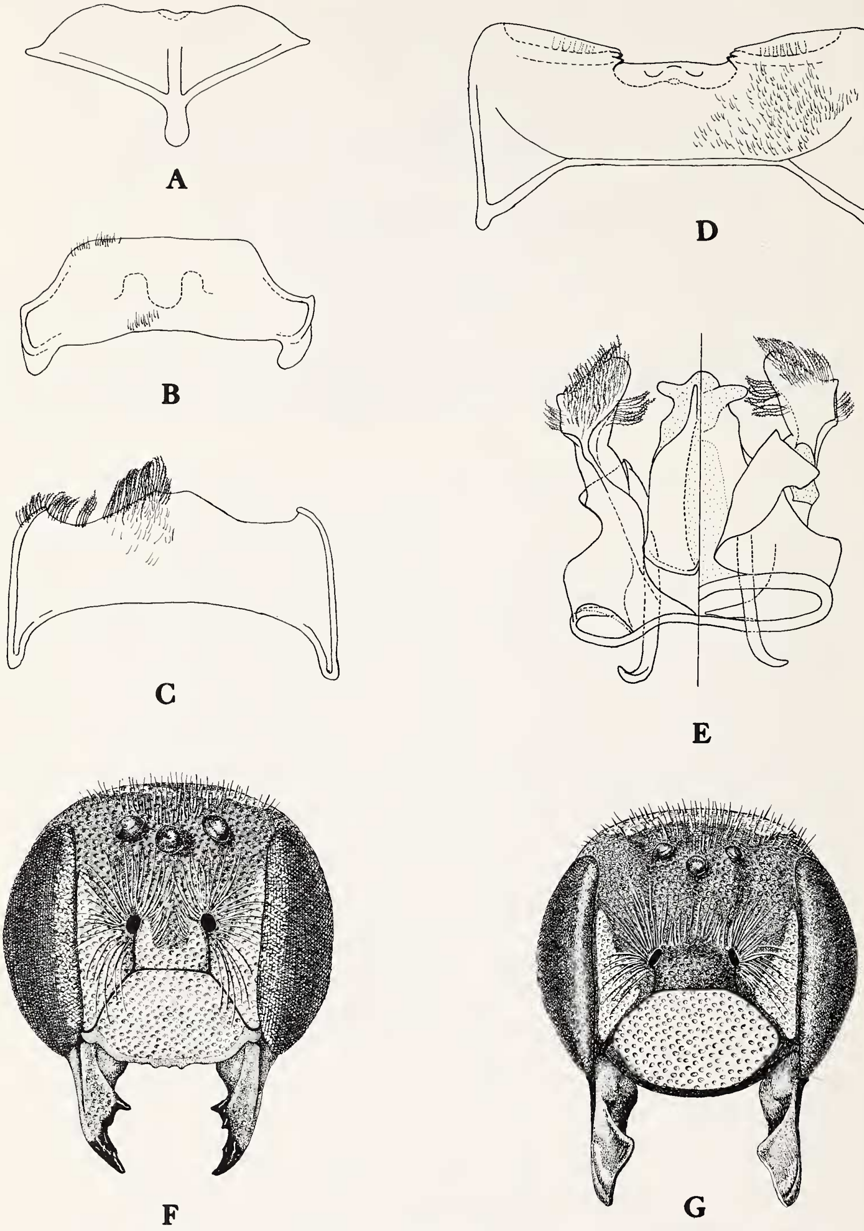

Figure 1. Heteranthidium autumnale Snelling, new species. A.-D., male sternites VIII, VII, VI, V, respectively, vestiture removed from one side; E., male genitalia, left half ventral aspect, right half dorsal aspect; F., male face; G., female face. F. and G. drawn by Mrs. Evie Templeton, Los Angeles County Museum of Natural History.

Head broader than long; facial breadth at level of clypeal base 0.86 times distance from anterior ocellus to apex of clypeus; first flagellar segment slightly longer than second; distance between posterior ocelli 1.2 times distance between these ocelli and eyes, 0.9 times distance between ocelli and posterior margin of vertex. Mandibles tridentate. Apical clypeal margin nearly straight, with three low, rounded denticles medially, distance between denticles exceeding their height; disc, when viewed from above, more strongly convex than in related species, punctures coarse, deep, contiguous, integument shining between punctures; punctures of remainder of head mostly a little finer, more irregular, more dense.

Carina of pronotal lobes high, height equal to about one-third times an ocellar diameter; punctures of mesocutum, axillae and mesoscutellum deep, smaller than those of clypeus, very dense, so that surface appears subopaque, granulose; upper half of anterior face of mesepisternum distinctly, rather closely punctate, a few smaller punctures present, lower half shinier, very sparsely punctate; lateral faces with dense, coarse punctures, integument shining; tegulae with fine, dense punctures; basal area of propodeum densely, rugosely punctate; integument minutely tessellate; discal and lateral areas of propodeum with punctures a little finer and less dense. Spine at apex of anterior coxae about as long as basal width; middle tibiae broad, a little more than twice as long as broad; middle basitarsi about five times longer than wide, equal in length to hind basitarsi, which are about four-fifths as long as the hind tibiae.

Abdominal tergites with narrow, impunctate apical margins, the discal punctures finer than those of mesoscutum, separated by about one-half a puncture diameter; pygidial carina, in profile, distinctly concave; apical margin of pygidium distinctly convergent toward the apical process formed by the median carina; sternite III with a pair of low, medio-posteriorly directed blunt tubercules on each side of mid line, near apical margin; sternites V-VIII hidden.

Female: Length, 14 mm.; of forewing, 9 mm. Black, with pale yellow maculae as follows: obscure preapical blotch on outer side of mandibles; clypeus, except apical margin and sutural infuscations; triangular lateral face marks ending slightly below level of anterior ocellus; short stripe behind upper third of eye; irregular, but rather broad, stripe across summit of vertex; obscure spot on outer, anterior corner of pronotal lobes; anterior two-fifths of tegulae; broad stripe along sides of mesoscutum; large spots on axillae and mesoscutellum; spot at base, and another, obscure, spot about three-fourths along length of the anterior tibiae; basal spot on middle and hind tibiae; narrow stripe on basal three-fifths of hind basitarsi; medially narrowed, subapical bands of tergites I-V; tergite I with completely enclosed black spot on each side; tergites II-IV with anterior black emarginations of the bands on each side; tergite VI with a roughly butterfly-shaped macula. Legs, except maculae noted above; piceous, the apical tarsal segments and tarsal claws ferruginous; tibial spurs very dilute ferruginous.

Head broader than long; facial breadth at level of clypeal base 0.9 times distance from anterior ocellus to apex of clypeus; distance between posterior ocelli 1.1 times distance between ocelli and eyes, 0.9 times distance from ocelli to posterior margin of vertex. Apical clypeal margin gently, evenly convex, without median denticles, discal punctures coarse, shallow, contiguous; supraclypeal and baso-medial area of clypeus rather strongly arched; disc of clypeus, in profile, nearly flat. Punctures of frons variable, but generally finer and more dense than those of clypeus, especially laterally, immediately below anterior ocellus they are rather coarse, with flattened interspaces; punctures of vertex uniform, dense, finer than those of clypeus.

Thoracic punctation similar to that of male. Middle basitarsi about three times longer than broad, three-fourths as long as hind basitarsi, the latter a little over twice as long as broad, about four-fifths as long as their femora.

Abdominal punctation very similar to that of male; tergite VI, very densely, finely, punctate, surface opaque; scopa ferruginous medially, becoming paler basad and laterad.

Holotype male and allotype female from 3 miles northeast of Desert Hot Springs, Riverside County, California, 8 November, 1963, collected by R. McDiarmid. Mr. McDiarmid has informed me (*personal comm.*) that these specimens were flying around an unknown composite which was most likely a species of *Chrysothamnus*. The types are deposited in the collections of the Los Angeles County Museum of Natural History.

This species belongs to the *H. zebratum* (Cresson) complex, in the present taxonomic treatment of which there is much confusion. Since my interpretation of the various taxa involved differs from previous ones, it is advisable to review the development of the old arrangement. The first species to be described was *H. zebratum,* described by Cresson (1872) from both sexes, based on material from Texas and Colorado. Titus (1902) redescribed the male as *Protanthidium cockerelli.* When he erected the genus *Heteranthidium,* Cockerell (1904) was not aware that this species was congeneric with the type of the genus, *H. dorsale* (Lepeletier). In 1910, Graenicher described *Anthidium (Protanthidium) chippewaense* from material of both sexes taken in Wisconsin.

When Schwarz (1926) reviewed the genus, he included the above names and presented a key to the species as he understood them at that time. He subsequently (1928) described two additional members of this complex from California, *H. timberlakei* and *H. subtimberlakei.* Michener (1947) added *H. z. mississippi* from material collected in Mississippi. In the Catalog of Nearctic Hymenoptera Michener (1951) arranged the series as follows:

H. zebratum chippewaense (Graenicher). Wisconsin
H. zebratum mississippi Michener. Mississippi
H. zebratum subtimberlakei Schwarz. California
H. zebratum timberlakei Schwarz. California
H. zebratum zebratum (Cresson). South Dakota, Nebraska, Colorado, New Mexico, Texas.
synonym: *Protanthidium cockerelli* Titus.

Mitchell (1962) was able to show that *H. z. chippewaense, H. z. mississippi* and *H. z. zebratum* belong to a single, highly variable species, and accordingly synonymized the former two with the latter.

Since Dr. Stange has advised me (*in litt.*) that *H. z. subtimberlakei* is a synonym of *H. z. timberlakei,* there is no necessity for further reference to the former name. I here elevate *H. timberlakei* to species status, arranging the members of this complex as follows:

H. autumnale Snelling. Colorado Desert, California.
H. timberlakei Schwarz. San Diego County to Trinity County, California.
synonym: *H. subtimberlakei* Schwarz.
H. zebratum (Cresson). Rocky Mountains, east to Michigan and Mississippi.
synonyms: *H. z. mississippi* Michener, *H. z. chippewaense* (Graenicher), *H. cockerelli* (Titus).

Both *H. autumnale* and *H. timberlakei* differ from *H. zebratum* in a number of important features. The former two species both possess well-developed spines on the anterior coxae; these are lacking in *H. zebratum.* The pronotal lobes of *H. zebratum* are characteristically without a trace of a carina at the juncture of the anterior and dorsal surfaces. In *H. autumnale* and *H. timberlakei* these surfaces meet at a distinct angle (evenly rounded in *H. zebratum*); in *H. timberlakei* a fine, but distinct carina is present at this juncture, while in *H. autumnale* the carina is very high and strong, almost lamellate in appearance. In the latter two species, the basic outline of the apical clypeal margin is evenly convex; in *H. zebratum* the apex is slightly angulate, with a median convexity. In the males there are slight, but consistent differences in the apical sternites and genitalia. Finally, it should be pointed out that there is no evidence to show that the California forms intergrade with *H. zebratum.* The present writer inclines to the view that there is a complex of several closely related, allopatric species.

The following key should assist in the recognition of the various species currently known to occur in the United States. Two species, *H. cordaticeps* Michener and *H. fontemvitae* Schwarz are placed in the key on the basis of descriptions alone; the male of *H. cordaticeps* is unknown at the present.

KEY TO UNITED STATES SPECIES OF *HETERANTHIDIUM*

MALES

1. Thorax to some degree maculate; abdominal tergites with bands subapical in position 2
   Thorax entirely black, immaculate; abdominal tergites with narrow, ivory-colored, apical bands .... *H. ridingsi* (Cresson)
2. Third abdominal sternite without spines, at most with a pair of blunt, flattened tubercles on either side of midline; pygidium not distinctly tridentate

at apex 3
Third abdominal sternite with a pair of short, dark, slender spines; pygidium distinctly tridentate apically . . . . *H. fontemvitae* Schwarz

3. Pronotal tubercles rounded above, without a trace of a carina 4
Pronotal tubercles with at least a fine carina above, frequently sharply crested 5

4. Anterior coxae with short, blunt, flattened apical tubercles; pygidial apex emarginate; mesoscutum usually with L-shaped marks . . . . *H. occidentale* (Cresson)
Anterior coxae usually unarmed, at most with a very low, conical tubercle; pygidial apex pointed or bluntly rounded, not medially emarginate; mesoscutum usually immaculate, rarely with short lateral stripes near tegulae . . . . *H. zebratum* (Cresson)

5. Outer hind tibial spur thick, strongly curved near apex; apical process of first sternite high, longitudinally impressed, apical margin concave . . . . *H. dorsale* (Lepeletier)
Outer hind tibial spur slender, straight; first sternite without prominent apical elevation 6

6. Anterior face of mesepisternum strongly shining, very sparsely punctate; anterior margin of clypeus concave between two prominent teeth on each side of midline; apical margin of pygidium with sinuate, transparent apical lip . . . . *H. larreae* (Cockerell)
Anterior face of mesepisternum strongly roughened and/or punctate, at least on upper half; anterior margin of clypeus broadly convex, if slightly concave medially, then flanking teeth reduced to minute denticles; apical margin of pygidium variable 7

7. Hind basitarsi unusually short, about one-third as long as hind tibiae, shorter than following tarsal segments combined; apical margin of seventh tergite very slightly convex, appearing almost straight . . . . *H. crassipes* (Cresson)
Hind basitarsi well over half as long as hind tibiae, distinctly longer than following segments combined; apical margin of seventh tergite distinctly convex, usually slightly produced medially 8

8. Pygidial carina variable; clypeus sparsely pubescent 9
Pygidial carina, in profile, concave; clypeus densely pubescent . . . . *H. bequaerti* Schwarz

9. Pygidial carina, in profile, nearly straight; apical margin of pygidium evenly convex, the median carina forming a slightly projecting nipple; pronotal carina low and fine, but distinct; apical margin of clypeus with four to six strong teeth, the clypeal disc strongly shining between the coarse, rather shallow punctures . . . . *H. timberlakei* Schwarz
Pygidial carina, in profile, distinctly concave; apical margin of pygidium distinctly convergent toward the prominent apical process formed by the

apex of the median carina; pronotal carina high and sharp; apical margin of clypeus with teeth low and rounded, the clypeal disc moderately shining between coarse, deep punctures . . . . *H. autumnale* Snelling

FEMALES

1. Vertex with broad, deep median indentation, so that head appears somewhat heart-shaped; integument reddish-brown, with reddish maculae; pronotal carina strong . . . . *H. cordaticeps* Michener
   Vertex without indentation, head not at all cordate; integument largely black, with variable maculae; pronotal carina present or absent 2
2. Head, thorax and legs immaculate, abdominal tergites with pale, narrow, apical fasciae; pronotal lobes non-carinate . . . . *H. ridingsi* (Cresson)
   Head and thorax maculate; abdominal bands subapical in position, usually distinctly yellowish; if pale whitish, then broad; pronotal lobes with or without carina 3
3. Pronotal lobes non-carinate, usually rounded above (the summit of the anterior face is sometimes distinctly angulate in *H. occidentale,* but a carina is not present) 4
   Summit of anterior face of pronotal lobes sharply angulate and marked by a distinct, though sometimes fine, carina 5
4. Anterior coxae without apical spine, rarely with a very small conical tubercle; sixth tergite, in profile, very strongly convex; pronotal lobes always rounded, without angulation at summit of anterior face . . . . *H. zebratum* (Cresson)
   Anterior coxae with distinct, flattened apical spine; sixth tergite, in profile gently, gradually convex; pronotal lobe sometimes strongly angulate at summit of anterior face, never evenly and smoothly rounded as above . . . . *H. occidentale* (Cresson)
5. Clypeus black, immaculate, no supraclypeal spot; clypeus decidedly concave in profile toward apex, apex with four distinct, close-set teeth . . . . *H. bequaerti* Schwarz
   Clypeus yellow, except apical margin, supraclypeal spot usually present; clypeus usually evenly convex in profile, sometimes slightly flattened toward apex 6
6. Mesoscutum with a pair of elongate median stripes; tibiae wholly yellow externally 7
   Mesoscutum without elongate median stripes; tibiae usually with yellow stripes externally 8
7. Outer spur of hind tibiae thick, abruptly bent near apex; abdominal punctation dense, strong; propodeum entirely black . . . . *H. dorsale* (Lepeletier)
   Outer spur of hind tibiae slender, slightly curved apically; abdominal punctures sparse; propodeum maculate . . . . *H. larreae* (Cockerell)

8. Mesopleurae immaculate; carina of pronotal lobes very strong; anterior clypeal margin evenly rounded, without denticles; spines of anterior coxae long, slender, sharply pointed . . . . *H. autumnale* Snelling
   Mesopleurae distinctly maculate; carina of pronotal lobe usually low, fine; anterior clypeal margin with distinct denticles; anterior coxal spines rather broad, flattened 9
9. Abdomen semi-opaque, with dense, distinct punctation; mandibles yellow, except along apical edge; tibiae red, with yellow maculae; abdominal bands anteriorly emarginate on each side of midline . . . *H. fontemvitae* Schwarz
   Abdomen shining between large, moderately dense punctures; mandibles variable; tibiae black with yellow maculae; abdominal bands not anteriorly emarginate 10
10. Mandibles and sixth tergite black, immaculate; carina of pronotal lobes strong, sharp; hind basitarsi almost as broad as their tibiae, about twice as long as broad; erect pubescence of mesoscutal disc little, if any, longer than diameter of anterior ocellus . . . . *H. crassipes* (Cresson)
    Mandibles and sixth tergite maculate; carina of pronotal lobes low, fine; hind basitarsi distinctly narrower than their tibiae, about 2.5 times longer than broad; erect pubescence of mesoscutal disc much longer than diameter of anterior ocellus . . . . *H. timberlakei* Schwarz

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